AMENDMENTS TO THE CLAIMS

1. (Original) A method for improving the vision of an eye comprising the steps of determining points of focus for different locations on the corneal surface of the eye and treating the eye so as to shift points of focus to a predefined reference axis.

2. (Original) The method of Claim 1 wherein said treating step comprises effectively re-shaping the cornea by one of physically changing its shape and applying to the eye an optical lens intended to correct refractive error.

3. (Original) The method of Claim 2 wherein physical changing comprises performing corneal ablation on the cornea of the eye.

4. (Original) The method of Claim 2 wherein the applying step comprises applying to the eye one of a contact lens, a cataract lens, a phakic lens an intraoccular lens, an intracorneal lens and a spectacle lens.

5.(Currently Amended) The method of ~~any preceding claim~~ claim 4 wherein the reference axis passes through the HIGH point.

6. (Currently Amended) The method of ~~any preceding claim~~ claim 5 wherein the reference axis is the LOCAL Z-AXIS.

7. (Currently Amended) The method of ~~any preceding claim~~ claim 6 wherein the surface of the cornea is described in terms of a central cap-shaped portion and at least one peripheral band portion radially outward of the cap-shaped portion.

8. (Original) The method of Claim 7 wherein there are a plurality of band portions successively radially outward of each other.

9. (Currently Amended) The method of ~~any one of claims 7 or 8~~ claim 8 wherein a periphery of the cap-shaped portion is at least approximately 4.5 millimeters away from the reference axis.

10. (Currently Amended) The method of ~~any preceding claim~~ claim 9 performed with the aid of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of a cornea in three dimensions as a smooth, free-form surface, the treating step comprising changing the shape of at least a portion of the model to produce a modified surface model.

11. (Original) The method of Claim 10, wherein the treating step comprises one of conforming the shape of at least a portion of the cornea to the modified surface model, and conforming the shape of at least a portion of a surface of an optical lens to the modified surface model.

12. (Currently Amended) The method of ~~any one of claims 10 or 11~~ claim 11 wherein a central cap-shaped portion is modeled on the original surface model as a series of arcs, rotationally spaced about the reference axis and conforming to the surface model, said multiple locations being selected arcs extending between the reference axis and the periphery of the cap-shaped portion, an arc being refocused by:

locating the point X at which the perpendicular bisector of a chord between the ends of the arc intersects the reference axis;

the distance between point X and the intersection of the reference axis with the surface model being used as a radius to scribe, from point X, a modified arc between the two ends of the arc; and

smoothly joining modified arcs to define the modified surface model.

13. (Currently Amended) The method of ~~any one of claims 10-12~~ claim 12, wherein a band portion, radially outward of a central cap-shaped portion, is modeled on the original surface model as a series of arcs rotationally spaced about the reference axis and conforming to the surface model, said multiple locations being selected arcs extending between peripheries of a band portion, an arc being refocused by:

locating the point X at which the perpendicular bisector of a chord between the ends of the arc intersects the reference axis;

the distance between point X and the intersection of the reference axis with the surface model being used as a radius to scribe, from point X, a modified arc between the two ends of the arc; and

smoothly joining modified arcs to define the modified surface model.

14. (Currently Amended) The method ~~claim 12 or 13~~ of claim 13 further comprising the step of, after generating a modified arc, measuring the maximum distance of that arc from the corresponding original arc and, if that distance exceeds a threshold value, moving the point X along the reference axis and scribing a new modified arc from moved point X which does not exceed the threshold value.

15. (Currently Amended) The method of ~~any one of claims 10-14~~ claim 14 further comprising the steps of:

orienting the modified surface model in correspondence with the unmodified surface model;

moving the two models together until they just make contact;

if the point of initial contact is near the center of the modified surface model, moving the two models together further until the periphery of the modified surface model just contacts the original surface model;

16. (Original) An optical lens for improving the vision of an eye, the lens comprising areas of focus on a surface thereof corresponding to different locations on the corneal surface of the eye, each area of focus being shaped to shift the focus of the corresponding location of the cornea to a predefined reference axis in the eye.

17. (Original) The lens of claim 16 wherein the lens comprises one of a cataract lens, a phakic lens an intraoccular lens, an intracorneal lens and a spectacle lens.

18. (Currently Amended) The lens of ~~any one of claims 16 or 17~~ claim 17 wherein the reference axis passes through the HIGH point.

19. (Currently Amended) The lens of ~~any one of claims 16-18~~ claim 18 wherein the reference axis is the LOCAL Z-AXIS.

20. (Currently Amended) The lens of ~~any one of claims 16-19~~ claim 19 wherein the surface of the lens is constructed as a central cap-shaped portion and at least one peripheral band portion radially outward, with respect to said referenced axis, of the cap-shaped portion.

21. (Original) The lens of Claim 20 comprising a plurality of band portions successively radially outward of each other.

22. (Currently Amended) The method of ~~any one of claims 20-21~~ claim 21 wherein a periphery of the cap-shaped portion is at least approximately 4.5 millimeters away from the reference axis.

23. (Currently Amended) The lens of ~~any one of claims 16-23~~ claim 22 designed with the aid of computer program which produces a surface model of the cornea which closely represents

at least a portion of the surface of a cornea in three dimensions as a smooth, free-form surface, the model being modified in shape at each corresponding location at least a portion of the lens conforming in shape to the modified surface model.

24. (Original) In a system for improving the vision of an eye by effectively reshaping the cornea by one of controlling physically changing the shape of the cornea and controlling the shape of a lens to be applied to the eye to correct its refractive error, a controller which controls said reshaping so as to shift points of focus for different locations on the surface of the cornea to a predefined reference axis.

25. (Original) The system of Claim 24 wherein the lens comprises one of a cataract lens, a phakic lens an intraoccular lens, an intracorneal lens and a spectacle lens.

26. (Currently Amended) The system of ~~any one of claims 24-25~~ claim 25 wherein the controller causes reference axis to pass through the HIGH point.

27. (Currently Amended) The system of ~~any one of claims 24-26~~ claim 26 wherein the controller causes the reference axis to be substantially coincident with the LOCAL Z-AXIS.

28. (Currently Amended) The system of ~~any one of claims 24-27~~ claim 27 wherein the controller causes the surface of the lens to be constructed as a central cap-shaped portion and at least one peripheral band portion radially outward, with respect to said referenced axis, of the cap-shaped portion.

29. (Original) The lens of claim 28 wherein the controller causes the lens surface to include a plurality of band portions successively radially outward of each other.

30. (Currently Amended) The method of ~~any one of claims 28 or 29~~ claim 29 wherein the controller causes a periphery of the cap-shaped portion to be at least approximately 4.5 millimeters away from the reference axis.

31. (Currently Amended) The lens of ~~any one of claims 28-30~~ claim 30 wherein the controller makes use of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of the cornea in three dimensions as a smooth, free-form surface, the controller causing the model to be modified in shape at each corresponding location so that at least a portion of the lens conforms in shape to the modified surface model.

32.(New) The method of claim 1 wherein the reference axis passes through the HIGH point.

33. (New) The method of claim 1 wherein the reference axis is the LOCAL Z-AXIS.

34. (New) The method of claim 1 wherein the surface of the cornea is described in terms of a central cap-shaped portion and at least one peripheral band portion radially outward of the cap-shaped portion.

35. (New) The method of claim 7 wherein a periphery of the cap-shaped portion is at least approximately 4.5 millimeters away from the reference axis.

36. (New) The method of claim 7 performed with the aid of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of a cornea in three dimensions as a smooth, free-form surface, the treating step comprising changing the shape of at least a portion of the model to produce a modified surface model.

37. (New) The method of claim 2 performed with the aid of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of a cornea in three dimensions as a smooth, free-form surface, the treating step comprising changing the shape of at least a portion of the model to produce a modified surface model.

38. (New) The method of claim 1 performed with the aid of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of a

cornea in three dimensions as a smooth, free-form surface, the treating step comprising changing the shape of at least a portion of the model to produce a modified surface model.

39. (New) The method of Claim 38, wherein the treating step comprises one of conforming the shape of at least a portion of the cornea to the modified surface model, and conforming the shape of at least a portion of a surface of an optical lens to the modified surface model.

40. (New) The method of claim 39 wherein a central cap-shaped portion is modeled on the original surface model as a series of arcs, rotationally spaced about the reference axis and conforming to the surface model, said multiple locations being selected arcs extending between the reference axis and the periphery of the cap-shaped portion, an arc being refocused by:

locating the point X at which the perpendicular bisector of a chord between the ends of the arc intersects the reference axis;

the distance between point X and the intersection of the reference axis with the surface model being used as a radius to scribe, from point X, a modified arc between the two ends of the arc; and

smoothly joining modified arcs to define the modified surface model.

41. (New) The method of claim 38, wherein a band portion, radially outward of a central cap-shaped portion, is modeled on the original surface model as a series of arcs rotationally spaced about the reference axis and conforming to the surface model, said multiple locations being selected arcs extending between peripheries of a band portion, an arc being refocused by:

locating the point X at which the perpendicular bisector of a chord between the ends of the arc intersects the reference axis;

the distance between point X and the intersection of the reference axis with the surface model being used as a radius to scribe, from point X, a modified arc between the two ends of the arc; and

smoothly joining modified arcs to define the modified surface model.

42. (New) The method claim 41 further comprising the step of, after generating a modified arc, measuring the maximum distance of that arc from the corresponding original arc and, if that distance exceeds a threshold value, moving the point X along the reference axis and scribing a new modified arc from moved point X which does not exceed the threshold value.

43. (New) The method of claim 38 further comprising the steps of:

orienting the modified surface model in correspondence with the unmodified surface model;

moving the two models together until they just make contact;

if the point of initial contact is near the center of the modified surface model, moving the two models together further until the periphery of the modified surface model just contacts the original surface model;

44. (New) The lens of claim 16 wherein the reference axis passes through the HIGH point.

45. (New) The lens of claim 16 wherein the reference axis is the LOCAL Z-AXIS.

46. (New) The lens of claim 16 wherein the surface of the lens is constructed as a central cap-shaped portion and at least one peripheral band portion radially outward, with respect to said referenced axis, of the cap-shaped portion.

47. (New) The lens of Claim 46 comprising a plurality of band portions successively radially outward of each other.

48. (New) The method of claim 20 wherein a periphery of the cap-shaped portion is at least approximately 4.5 millimeters away from the reference axis.

49. (New) The lens of claim 16 designed with the aid of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of a cornea in three dimensions as a smooth, free-form surface, the model being modified in shape at each corresponding location at least a portion of the lens conforming in shape to the modified surface model.

50. (New) The system of claim 24 wherein the controller causes reference axis to pass through the HIGH point.

51. (New) The system of claim 24 wherein the controller causes the reference axis to be substantially coincident with the LOCAL Z-AXIS.

52. (New) The system of claim 24 wherein the controller causes the surface of the lens to be constructed as a central cap-shaped portion and at least one peripheral band portion radially outward, with respect to said referenced axis, of the cap-shaped portion.

53. (New) The lens of claim 52 wherein the controller causes the lens surface to include a plurality of band portions successively radially outward of each other.

54. (New) The method of claim 28 wherein the controller causes a periphery of the cap-shaped portion to be at least approximately 4.5 millimeters away from the reference axis.

55. (New) The lens of claims 28 wherein the controller makes use of computer program which produces a surface model of the cornea which closely represents at least a portion of the surface of the cornea in three dimensions as a smooth, free-form surface, the controller causing the model to be modified in shape at each corresponding location so that at least a portion of the lens conforms in shape to the modified surface model.